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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,864	03/09/2004	Cheng-Chung Liang	2003P03674US01	2679

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Siemens Corporation.
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

RADKIEWICZ, JARED

ART UNIT	PAPER NUMBER
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2624

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/796,864	Applicant(s) LIANG, CHENG-CHUNG	
	Examiner Jared W. Radkiewicz	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/20/2004</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 27-39 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 27 defines a program storage device embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for

that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 4, 5, 7, 8, 9, 11, 12, 14, 17, 18, 20, 21, 22, 24, 25, 27, 30, 31, 33, 34, 35, 37 and 38** are rejected under 35 U.S.C. 102(b) as being anticipated by Jakab et al. (Jakab et al. as cited in the IDS and linked to in the attached archived page as captured from www.archive.org on 9/9/2001).

Regarding **claim 1**, Jakab teaches a method for image segmentation in a three-dimensional environment ("the 3D Slicer", Jakab Title), the method comprising:

receiving scan data ("Your first job will be to "Add Volume". This will allow you to load the original data set", Jakab section titled "Initial Screen");

selecting a viewing vector relative to the scan data;

rendering the scan data as a 3D image about the viewing vector;

displaying the rendered 3D image (the illustration in Jakab section ""Creating a Label Map" shows a rendered view of 3D data being displayed relative to a viewing vector);

selecting a range of 2D image slices within the 3D image (Jakab's 3D Slicer operates on user inputted, user selected slices, "your original grayscale images", Jakab section titled "Segmenting Your Data");

performing 2D segmentation on the selected slices relative to the viewing vector to obtain a segmented 3D object ("You must now click through all 60 of your original grayscale images and segment them", Jakab section titled "Segmenting Your Data");
and

displaying the segmented 3D object ("The model should now be created and will be displayed on the 3D image", Jakab section titled "Making Your 3D Model").

Regarding **claim 14**, Jakab teaches the method outlined in claim 1 operating on a computer apparatus ("Slicer operates on a SUN Microsystems UNIX based network", Jakab Introduction).

Regarding **claim 27**, Jakab teaches the method outlined in claim 1 operating on a computer apparatus wherein computer program inherently reside on some form of computer readable medium ("Slicer operates on a SUN Microsystems UNIX based network", Jakab Introduction).

Regarding **claims 4, 17, and 30**, Jakab teaches the method as defined in claims 1, 14, and 27 wherein the step of selecting a range of slices within the 3D image comprises selecting 2D image planes along different axis to be displayed within the rendered 3D scene (The figure "Label Map" shows three 2D slices selected along different axis within the 3D scene, Jakab section titled "Creating a Label Map").

Regarding **claims 5, 18, and 31**, Jakab teaches the method as defined in claims 4, 17, and 30 wherein the step of performing 2D segmentation comprises determining the correspondence between a mouse point and the data within a 2D image in the 3D rendered image ("Now take your mouse and encircle the section of the image that you wish to segment", wherein the image being operated on is a 2D image and is also a part of the 3D image; Jakab section titled "Segmenting Your Data").

Regarding **claims 7, 20, and 33**, Jakab teaches the method as defined in claims 1, 14, and 27 wherein the step of performing 2D segmentation comprises drawing the segmentation contours in a plurality of different planes in the rendered 3D image within

a single drawing session ("You must now click through all 60 of your original grayscale images and segment them", Jakab section titled "Segmenting Your Data").

Regarding **claims 8, 21, and 34**, Jakab teaches the method as defined in claim 7, 20, and 33 further comprising back-projecting the point coordinates of the segmentation contours within each 2D image plane to the 3D coordinate space ("select the volume to be used to create your 3D model. This is the segmented label map that you saved in step 5", Jakab section titled "Making Your 3D Model").

Regarding **claims 9, 22, and 35**, Jakab teaches the method as defined in claims 1, 14, and 27 further comprising:

selecting a second viewing vector relative to the rendered 3D image; and re-rendering the scan data as a 3D image about the second viewing vector ("Or" stands for image orientation - change by clicking on it and selecting", Jakab section titled "Creating a Label Map").

Regarding **claims 10, 23, and 36**, Jakab teaches the method as defined in claims 1, 14, and 27 with the step of performing 2D segmentation comprising:

selecting an anchor point; transforming the anchor point from object coordinates into window coordinates; and determining an intersection of the anchor point with an image plane ("Now take your mouse and encircle the section of the image that you wish to segment ... The polygon you created should connect itself and theoretically overlay,

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for example, the tumor in the segmented slice”, Jakab section titled “Segmenting Your Data”).

Regarding **claims 11, 24, and 37**, Jakab teaches the method as defined in claims 1, 14, and 27 wherein the scan data is produced by a medical imaging device (Jakab’s software operates on “MRI images of the brain”, Jakab section titled “Starting the Slicer”).

Regarding **claims 12, 25, and 38**, Jakab teaches the method as defined in claims 11, 24, and 37 wherein the segmented 3D object is indicative of an organ (Jakab uses the examples of “ventricles for your ventricles label map or tumor for your tumor label map”, Jakab section titled “Making Your 3D Model”).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims **2, 3, 15, 16, 28, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jakab et al. in combination with Gering (David T. Gering: "A System for Surgical Planning and Guidance using Image Fusion and Interventional MR" Thesis: Massachusetts Institute of Technology 1999).

Regarding claims **2, 15, and 28**, Jakab teaches claims 1, 14, and 27.

Jakab does not teach claims 1, 14, or 27 further comprising performing in-scene control of slices within the 3D image by grabbing tabs on the 2D slice images within a rendered 3D image.

Gering teaches controlling slice selection within a 3D view ("users to allow the slice-by-slice editing to be administered on either axial, coronal, or sagittal slices merely by clicking on the appropriate slice", Gering Section 2.4.1 Page 39)

It would have been obvious at the time of invention to one of ordinary skill in the art to use the direct slice selection of Gering in the 3D segmentation method of Jakab to "prevent[s] the screen from becoming cluttered with confusing, overlapping, pop-ups" (Gering Section 2.9.1 Page 56).

Regarding claims **3, 16, and 29**, Jakab and Gering teach claims 1, 14, and 27 further comprising providing sliding bars movable along restricted directions to guide the selection of slice ranges ("By placing your mouse over this box, you will see a sliding scale which allows you to move through the original data images", Jakab section titled "Creating a Label Map").

Claims 6, 19, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jakab et al. in combination with Rubin (US 5,264,836).

Regarding **Claims 6, 19, and 32**, Jakab teaches claims 5, 18, and 31, respectively.

Jakab does not teach the method as defined in claims 5, 18, or 31, the step of determining the correspondence comprising determining the intersection of the mouse point and the 2D slice image within the 3D scene by:

receiving a mouse point in window coordinates;

inverse transforming the mouse point to get its corresponding first point in object coordinates of the scan data;

computing a second point along a straight vector from the first mouse point; and determining the intersection point as a function of the first point, a distance from the first point to the intersection point, and a vector obtained by subtracting the first point from the second point.

Rubin teaches a method wherein the step of determining the correspondence comprising determining the intersection of the mouse point and the 2D slice image within the 3D scene by:

receiving a mouse point in window coordinates; inverse transforming the mouse point to get its corresponding first point in object coordinates of the scan data

("converting two dimensional mouse points into three dimensional coordinates", Rubin);

computing a second point along a straight vector from the first mouse point; and determining the intersection point as a function of the first point, a distance from the first

point to the intersection point, and a vector obtained by subtracting the first point from the second point (Rubin Figures 2-7 depict the process of calculating a 'shadow line' in a 3D scene with reference to a 2D 'Translation Plane').

It would have been obvious at the time of invention to one of ordinary skill in the art to use the 2D cursor control in a 3D environment of Rubin in the segmentation device of Jakab because Rubin's method can "be readily implemented within a software program (such as a Computer Aided Design (CAD) program) running on any of a number of commercially available computer systems (i.e., a Macintosh computer manufactured by Apple Computer, Inc., of Cupertino, Calif.) which are operative to work with a two axes control device (such as a mouse" (Rubin Column 2 Lines 21-30), and Jakab's segmentation device is, generally speaking, a 3D CAD program running on a computer with a two axes control device.

6. Claims **13, 26, and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jakab et al. in combination with Blake et al. (US 2003/0103682 A1).

Regarding **claims 13, 26, and 38**, Jakab teaches claims 1, 14, and 27.

Jakab does not teach claims 1, 14, or 27 further comprising manually overriding a section of 2D segmentation disposed contiguously between two sections of automatic 2D segmentation.

Blake teaches manually overriding a section of automatic 2D segmentation ("The user likelihood .sup.u(q.sub.i) is a vehicle for guidance supplied interactively, by a user,

wishing to bias or override the curve constructed automatically on the basis of L.sub.i.sup.e and L.sub.i.sup.e alone.", Blake Paragraph 90)

It would have been obvious at the time of invention to one of ordinary skill in the art to provide the manual override to automatic segmentation of Blake to the invention of Jakab to provide "a robust mechanism or component that provides boundary definition of an object in an image for purposes of selecting a region of interest" (Blake Paragraph 12).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared W. Radkiewicz whose telephone number is (571) 270-1577. The examiner can normally be reached on 8:00 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO

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Customer Service Representative or access to the automated information system, call
800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JWR

/Brian P. Werner/

Supervisory Patent Examiner (SPE), Art Unit 2624